

We claim:

1. Apparatus for stacking sheets of printing media, said sheets having folds therein, comprising:
 - a) a workpiece that stacks the sheets, sheet-by-sheet, and registers the sheets on the folds; and
 - b) means for positioning the sheets, sheet-by-sheet, with respect to the workpiece and connected thereto, thereby stacking the sheets.
2. The apparatus of claim 1 wherein each sheet has a centerline, the fold is located on the centerline of each sheet, and each sheet is registered along its centerline by the workpiece.
3. The apparatus of claim 1 wherein the workpiece is elongate and has a V shape with a longitudinal peak.
4. The apparatus of claim 1 further including means, connected to the workpiece, for unloading the sheets from the workpiece after a stack is formed.
5. The apparatus of claim 1 wherein the workpiece includes an anvil for crimping staples.

6. Apparatus for folding sheets of printing media, comprising:
 - a) a V-shaped fold roller;
 - b) an elongate fold blade;
 - c) means for positioning the sheets, sheet-by-sheet, on the fold blade and connected thereto; and
 - d) means for translating the fold roller with respect to the fold blade, thereby folding the sheets, sheet-by-sheet.
7. The apparatus of claim 6 further including an elongate flap connected to the fold roller that initiates the fold in each sheet, sheet-by-sheet.
8. The apparatus of claim 7 further including a second elongate flap connected to the fold roller, said flaps initiate the fold in each sheet, sheet-by-sheet, and said flaps are outward opening away from the fold blade.
9. The apparatus of claim 8 further including a hinge for movably mounting said flaps and for accommodating sheets of differing thicknesses.

10. The apparatus of claim 6 further including a pinch roller that captures the sheets on the fold blade, sheet-by-sheet, prior to folding.
11. The apparatus of claim 6 wherein the fold roller has a cylindrical outer wall and the cylindrical wall has a V-shaped opening therein that accepts both the sheet and the fold blade during folding.
12. The apparatus of claim 6 wherein the fold roller has two complementary disks spring loaded together on a common axle and each disk has a tapered, inward facing peripheral edge, thereby accommodating sheets of various thicknesses.
13. The apparatus of claim 6 further including means, connected to the fold blade, for unloading the sheets, sheet-by-sheet, from the apparatus after folding.
14. Apparatus for assembling sheets of printing media for booklets, comprising:
 - a) a media trimmer that cuts the sheets, sheet-by-sheet, to pre-determined widths;

- b) a sheet folder, connected to the media trimmer, that folds the sheets, sheet-by-sheet, and
 - c) a sheet stacker, connected to the sheet folder, that collects the sheets, sheet-by-sheet, in a stack.
15. The apparatus of claim 14 wherein each sheet has a position in the booklet being assembled and the media trimmer cuts the sheets to pre-determined widths depending on the position of the sheet in the booklet.
16. The apparatus of claim 15 wherein each sheet has a position in the booklet being assembled and a thickness and the media trimmer cuts the sheets, sheet-by-sheet, to pre-determined widths depending of the position of the sheet in the booklet and the thickness of each sheet.
17. The apparatus of claim 14 further including means, connected to the trimmer, folder, and stacker, for positioning the sheets, sheet-by-sheet, with respect thereto.
18. The apparatus of claim 14 further including a stapler, connected to the sheet stacker, that staples the stack of sheets together into a booklet.

19. The apparatus of claim 14 further including a punch, connected to the sheet folder, that punches a hole in the stack of sheets.
20. The apparatus of claim 14 further including a punch, connected to the sheet stacker, that punches out a notch in the stack of sheets.
21. The apparatus of claim 14 further including a second sheet folder, connected to the trimmer, that folds the sheets, sheet-by-sheet, with a fold opposite to the fold made by the first sheet folder, thereby making Z-shaped sheets.
22. Apparatus for assembling sheets for booklets, each sheet having a position in the booklet, said booklets when finished are folded and have an edge, comprising:
 - a) a paper trimmer that cuts the sheets, sheet-by-sheet, to pre-determined widths depending on the position of the sheet in the booklet so that the edge of a finished, folded booklet formed from the sheets is flat as if all of the sheets had been trimmed together to final size;
 - b) a sheet folder, connected to the paper trimmer, that folds the sheets, sheet-by-sheet; and

- c) a sheet stack r, connected to the sheet folder, that collects the trimmed sheets, sheet-by-sheet, in a stack and registers the sheets, sheet-by-sheet on the fold in each sheet.
23. The apparatus of claim 22 wherein the sheet folder includes an elongate fold blade, a pinch roller that captures each sheet on the fold blade, and a fold roller that folds each sheet over the fold blade.
24. The apparatus of claim 23 wherein the sheet folder further includes two, elongate, outward opening, fold wings that initiate folding each sheet after the pinch roller captures each sheet.
25. The apparatus of claim 22 further including a paper feeder that loads the sheets, sheet-by-sheet, into the paper trimmer, said paper feeder being remote from a source of the sheets being made into booklets.
26. The apparatus of claim 22 further including a printer that loads the sheets, sheet-by-sheet, into the paper trimmer after each sheet is printed.
27. The apparatus of claim 22 further including a bar code reader connected to the apparatus for receiving job and

media parameters from a machine readable job ticket.

28. The apparatus of claim 22 further including an unloader that removes the stacks of sheets from the apparatus.
29. Apparatus for assembling sheets for booklets, each sheet having a position in the booklet, comprising:
- a) a paper feeder that loads the sheets, sheet-by-sheet, into the booklet maker;
 - b) a paper trimmer, connected to the feeder, that cuts the sheets, sheet-by-sheet, to pre-determined widths depending on the position of the sheet in the booklet;
 - c) a sheet folder, connected to the trimmer, that folds the sheets, sheet-by-sheet;
 - d) a sheet stacker, connected to the folder, that collects the sheets, sheet-by-sheet, in a stack;
 - e) means, connected to the trimmer, folder, and stacker, for positioning the sheets, sheet-by-sheet, with respect thereto; and
 - f) an ejector, connected to the sheet stacker, that removes the stacks of sheets from the apparatus.

30. The apparatus of claim 29 further including a paper aligner that aligns the sheets with respect to the trimmer, sheet-by-sheet, before the sheets are cut to pre-determined widths.
31. The apparatus of claim 29 wherein the sheet positioning means is a non-slip-wheel sheet positioner, connected to the trimmer, folder, and stacker, for positioning the sheets, sheet-by-sheet, with respect thereto so that the sheets are cut to various pre-determined widths and so that the sheets are all folded along a common fold line.
32. The apparatus of claim 29 further including a punch, connected to the trimmer, that cuts out a portion of the edge from a sheet at a predetermined position and depth, forming a notch.
33. The apparatus of claim 29 further including a punch, connected to the trimmer, that cuts out a portion of the edge from a sheet at a predetermined position and depth, forming a tab.
34. The apparatus of claim 29 further including a punch, connected to the trimmer, that punches a hole in a sheet.

35. The apparatus of claim 29 further including a stapler, connected to the stacker, that staples the stack of sheets together into a saddle stitched booklet.
36. The apparatus of claim 29 wherein the sheet folder folds the sheets along the centerline of each trimmed sheet.
37. Method for stacking sheets of printing media, comprising the steps of:
- a) collecting the sheets in a stack on a workpiece, sheet-by-sheet, said sheets each having a fold therein;
 - b) registering the sheets on the workpiece, sheet-by-sheet, with the fold in each sheet; and
 - c) unloading the stack of collected and registered sheets from the workpiece.
38. The method of claim 37 including the step of trimming the sheets, sheet-by-sheet, for booklets, each sheet having a width depending on the position of the sheet in the booklet.
39. The method of claim 37 including the step of stapling the sheets in the stack together, thereby forming saddle stitched booklets.

40. The method of claim 37 including the step of punching a hole in the sheets, sheet-by-sheet.
41. The method of claim 37 including the step of cutting out a notch in selected sheets, sheet-by-sheet.
42. A method for folding sheets of printing media, comprising the steps of:
- a) positioning the sheets, sheet-by-sheet, in a media folder;
 - b) folding the sheets, sheet-by-sheet, in the media folder; and
 - c) unloading the folded sheets, sheet-by-sheet, from the folder.
43. The method of claim 42 further including the step of folding the sheets more than once so that each sheet has a plurality of folds.
44. The method of claim 42 further including the step of capturing the sheets, sheet-by-sheet, prior to the step of folding.
45. The method of claim 42 further including the step of trimming the sheets, sheet-by-sheet, in accordance with a

pre-determined schedule.

46. The method of claim 42 further including the step of alternately folding the sheets, sheet-by-sheet, so that each sheet has a Z-shape after being folded.
47. The method of claim 42 further including the step of multiply folding the sheets, sheet-by-sheet, so that selected sheets have a U-shape after being folded.
48. The method of claim 42 further including the step of putting a slack loop in each sheet in the media folder prior to the step of folding.
49. The method of claim 42 wherein the step of folding includes the step of translating a fold roller back and forth across a fold blade over which each sheet is positioned.
50. A method for assembling sheets for booklets, each sheet having a position in the booklet, comprising the steps of:
 - a) trimming the sheets, sheet-by-sheet, with a cutter to a pre-determined width depending on the position of the sheet in the booklet;

- b) folding the sheets, sheet-by-sheet, in a media folder; and
 - c) stacking the folded sheets in stacks along a common fold line in each sheet.
51. The method of claim 50 further including the step of feeding the sheets, sheet-by-sheet, into the cutter prior to the step of trimming.
52. The method of claim 50 further including the step of measuring the width of the sheets, sheet-by-sheet, prior to the step of trimming each sheet.
53. The method of claim 50 further including the step of measuring the thickness of the sheets, sheet-by-sheet, prior to the step of trimming each sheet.
54. The method of claim 50 wherein the step of folding includes the step of folding the sheets, sheet-by-sheet, along the centerline of each sheet after the step of trimming.
55. The method of claim 50 further including the steps of stapling the sheets together in the stack and forming a saddle stitched booklet thereby.

56. The method of claim 50 further including the step of capturing the sheets, sheet-by-sheet, in the media folder prior to the step of folding.
57. The method of claim 50 further including the step of capturing the sheets, sheet-by-sheet, in a bail prior to the step of trimming.
58. The method of claim 50 further including the step of punching a hole in selected sheets, sheet-by-sheet, after the step of trimming.
59. The method of claim 50 further including the step of punching a notch out of selected sheets, sheet-by-sheet, at a predetermined position and depth on the edge of the sheet after the step of trimming.
60. The method of claim 50 further including the step of multiply folding the sheets in the same direction as a first fold, sheet-by-sheet, at different locations.
61. The method of claim 50 further including the step of multiply folding the sheets in an opposite direction from a first fold, sheet-by-sheet, at different locations.

62. The method of claim 50 further including the step of displacing the images printed on the sheets, sheet-by-sheet, according to the width of each sheet after trimming so that the printed images are offset a prescribed distance from a fold line.